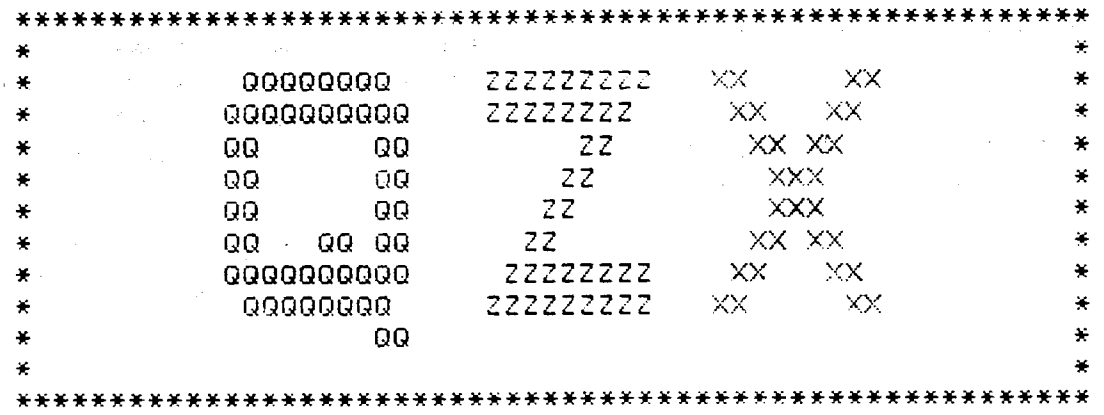

The Journal Covering Amateur Radio & Sinclair Computers
ZX80; Micro-Ace; ZX81; TS1000, 1500, & 2068; QL; Z88
Alex. F. Burr, K5XY, Publisher
2025 O'Donnell Drive
Las Cruces, New Mexico
88001

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EDITOR'S NOTES

K5XY

Some of you will have noticed that in the last issue I cleaned up the back page a bit to give it a more printed look.

Speaking of printing, I mentioned that I had changed printers to keep costs down. It has; however they have not gotten an order completely right yet. Futhermore, although I order the same number of copies each month, I have yet to have two bills come out to the exact same amount. Usually QZX comes out ahead, so I have not complained about this particular oddity.

Precision 0V reference provides nirvana

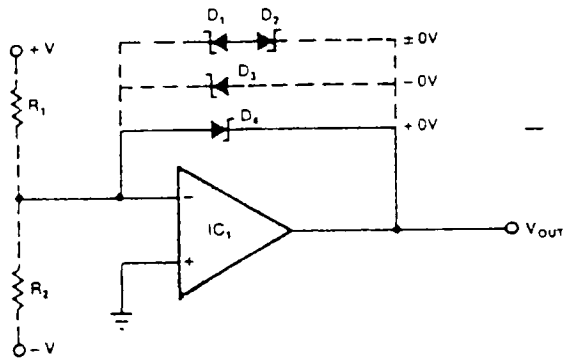
Bill Travis
Optimistic Nihilist, Boston, MA

Using an ordinary op amp and one 0V zener diode, this circuit (figure) provides a rock-stable source of nothingness. The circuit shown in solid lines is a unipolar +0V supply; with the broken-line feedback connections, you can also configure it for −0V unipolar or ±0V bipolar outputs.

Calculating the errors due to zener TC is easy: Just multiply the 25°C output (0V) by $1+\Delta T(TC)/10^6$ for any deviation from 25°C. For example, consider a 0V zener diode with a TC of 500 ppm/°C, operating at 125°C ($\Delta T=100°C$):

$$V_{OUT}=0V\times(1+(100)(500)/10^6)$$
$$=0V\times(1.05)$$
$$=0V.$$

You can see that the circuit is reasonably insensitive to zener TC. If you need a better drift figure than zero, adjust zener current for lowest TC with R_1 (for −0V), R_2 (for +0V) or both R_1 and R_2 (for ±0V). **EDN**



An op amp and a zener diode *combine to form an inexpensive, stable source of nothingness.*

To Vote For This Design, Circle No e

Bob O'Leary, KQ2F
21 Kate Terrace
Piscataway, NJ 08854

January 18, 1990

Alex Burr, K5XY
QZX Journal Editor & Publisher
2025 O'Donnell Drive
Las Cruces, NM 88001

RE: End of an Era

Dear Alex,

I could not allow my subscription to expire without first writing to you to express my thanks for a job well done. I have every issue of QZX ever published, including copies of all of K2MI Marty Irons' original efforts. I've learned alot with the Sinclair/Timex, and running the 40 meter QZX Net during the early '80s made it all alot of fun. I tried Commode Door for a while, but gave all that stuff away to a friend. My "unclassified ad" last year brought no response, so I gave most of my Sinclair/Timex hardware and software away to my retired brother-in-law. Now he'll have something to play with besides my sister.

This past spring I finally gave in to the pressure of job and career and I bought an MS-DOS machine for home use. Now I can bring the job home. Now I also know that I'm nuts! Actually, it's much easier learning and devoting myself to one operating system.

But, I want to mention how much I enjoyed LU8MAD's Little Monster in the January issue. About 5 years ago I also created a "little monster" of my own with which I will never part. It's a ZX-81 with Memotech 64K RAM, Exatron stringy-floppy high speed tape storage, composite video, power supply and expansion board all tucked away in a neat little metal cabinet with a full size keyboard and an attached external thermal printer. I still use it for satellite tracking, and I still have a wealth of information about the ZX-80, 81, TS-1000, 1500, and 2068. I never graduated to the QL.

Never-the-less, I have decided to let the 1980s be the end of the Sinclair/Timex era for me, and I bid you a fond farewell.

Thanks again and 73.

Sincerely,

Bob, KQ2F

THE FUTURE QZX

K5XY

The letter from KQ2F, printed on the previous page, sums up the feelings and actions of many QZX readers. As Bob mentions, he has been a QZX reader from the start. Most of our readers have been with us for four or more years, and many of them have bought computers with other operating systems. And, like Bob, a few each month are not renewing because of a desire to concentrate on fewer activities or for other reasons. As a result the number of readers is going down and the cost per reader is going up.

Nevertheless QZX has readers in 27 states and about four different countries. Still the trend is clear. Without new hardware to attract new readers, it is inevitable that the list of readers will continue to decline.

However QZX will NOT stop publishing in the near future. The series of article on the SCL has at least three more months to run. There is a modest backlog of relevant interesting material yet to run, but the number of article submitted is getting smaller. There are really only two hams, WA6DLI and LU8MAD, besides myself who are doing any writing for QZX.

The interest in the Sinclair family of computers is not dead. The is a national convention planned for June, a number of users groups and newsletters are still publishing, and vendors are still active. One can get packet TNC interfaces for most of our computers and NU4V is still supplying his very good CW program and board. I receive a number of telephone calls and letters from hams wanting to put Sinclair computers to work in their stations. Unfortunately these calls rarely translate into additional readers.

It seems to me that there are four things QZX can do.

1. Continue as is.
2. Somebody else take over.
3. Quit.
4. Expand the coverage.

Some comments on these choices follow.

The inertial of the world being what it is, I expect that the first alternative is the most likely one.

If there is anybody else who would like to take over, I will be happy to negotiate a smooth takeover.

QZX will not quit as long as there are at least a few hams interested in its contents.

The idea of expanding the coverage is intriguing. One could include items of interest to MSDOS, Commodore, Amiga, and Macintosh, as well as Sinclair users. There are a number of difficulties with this idea. I do not know a whole lot about some of these computers, and it is difficult to get hams to write well about them. CTM, a long time QZX advertiser, tried to become the magazine for computers and hams. The publisher worked long and hard to make it a commercial success and failed to get the good articles which would attract a sufficient number of readers. Coverage of a number of computers means that the amount of editorial material on any one computer will be strictly limited so the reader really does not get much information for the money.

Thus the end result is that QZX will go along much as it has, at least for a while. If you have any comments on the direction you think QZX should go, be sure to send them to me.

EXPLORING THE TS1000 SINCLAIR LOGIC CHIP (SCL) VI

Don Lamen

This article is a continuation of the series which began in the October 1989 issue of QZX. The purpose is to explain the function of the SCL logic chip in the ZX and TS1000 series of Sinclair computers. This chip is a custom chip designed particularly for our computers. The previous articles gave some background on the chip, provided a functional diagram, and listed 17 separate functions performed by the chip. These and succeeding articles discuss these functions individually and provide an equivalent circuit diagram for the function. These circuit diagrams are only the equivalent of the actual circuits inside the chip because nothing is known about the real connections inside, but the circuits given here will perform the function of the real circuit. For a list of these 17 functions see the October issue of QZX.

INTERNAL DATA LATCH

The Internal Data Latch is a 6 bit latch which latches in the data on Data Bus Lines D0 through D5 during Dot Cycle 3 (Code 1 AND 2 AND NOT 4). The latched data is output to the Address Lines A3' through A8' as part of the address to access the Dot Pattern from the ROM during Dot Cycle 6 and 7 (Code 2 AND 4). This latch is shown in the lower left hand corner of the circuit diagram for the internal data bus printed in the January 1990 issue of QZX.

NO-OP GENERATOR

The No-Op Generator consists of eight inverters which forces all eight of the Data Bus Lines to 0 during Dot Cycles 4 and 5 (Code NOT 2 AND 4), just in time for the Z-80 to READ. The NOP instruction is 00000000 Binary. This instruction causes the microprocessor to fetch the next instruction, which is actually the next byte of data in the Data File. These inverters are shown in the upper right corner of the circuit diagram for the internal data bus printed in the January QZX.

TWO SHIFT REGISTERS

The Shift Registers are alternately made active by bit 4 of the first counter of the Main Timing Chain (Mux Circuit, see the first figure in the December 1989 issue of QZX). They are eight bit shift registers. The contents of one shift register is being shifted out while the other one is inhibited. When the contents of the active shift register is shifted out the most significant bit is shifted out first and as each bit is shifted out a zero is shifted in via the serial input. The inhibited shift register is loaded with the contents of the Data Bus during Dot Cycle 7 (Code 1 AND 2 AND 4). These shift registers are shown at the bottom of the last figure in the October 1989 issue of QZX.

I/O INPUT PORT FE

The Input Port FE as far as I can tell uses only 7 bits. Bits 0 through bit 4 monitor the keyboard. Bit 6 receives its input from pin 22 (USA/UK). Bit 7 receives its input from pin 20 (Tape In). I have not found any use being made of bit 5 in conjunction with Input Port FE. If bit 5 is not used with this port, then its value should always be 1, while reading the keyboard or inputing tape data, as all Data Lines are pulled high by resistors. The Input Port FE is shown at the bottom right hand corner of the last figure in the October 1989 issue of QZX.

OUTPUT BUFFER TO ROM (ROM DRIVER)

The Output Buffer is a nine bit tri-state buffer which supplies part of an address to access a Dot Pattern from the ROM.

The rest of the address is supplied by the microprocessor when it puts the Refresh Address on the main address lines, and comes from the Interrupt Register. The format of the whole address is

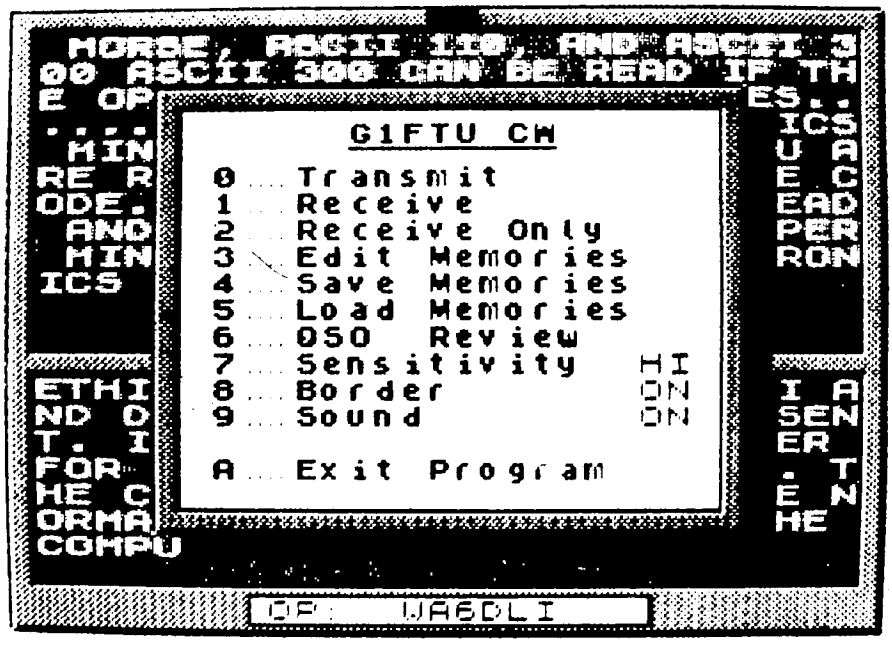
I Reg. A15-A9
Char. Code A8'-A3'
Scan Count A2'-A0'

or

I*256+Code*8+COUNT

The Output Buffer to ROM is shown at the top left hand corner of the last figure in the October 1989 issue of QZX.

Next month we will study the I/O decoder and several other circuits used in connection with the decoder, including one which is actually outside the SCL chip.



Menu for G1FTU CW program for Spectrum

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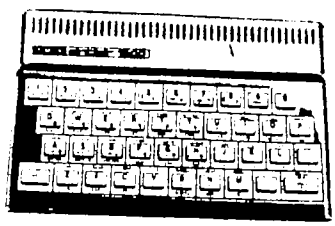
WANTED: UNCLASSIFIED ADS for publication in QZX. Cost is 1 cent for each keystroke (characters, blanks, etc.). Payment must be included with order. This is an excellent way to sell your program or unwanted equipment, ask for help, or find a specific program. Send your ad with payment to QZX, 2025 O'Donnell, Las Cruces, NM 88001.

WANTED: Schematic for Mindware MW-100 printer. Also MLI 2.0 program for use with CWSS system. Geo. Fariss, 1214 Mages St., Las Cruces, NM 88005.

QZX Discount: 15% discount on all orders mentioning QZX. T & C Services (address in ad in this issue).

FOR SALE: Book "Z80 Assembly Language Programming" by Lance A. Leventhal. Published by Osborne/Mc Graw Hill 1979. Over 600 pages, new condition. Price $10 + $2 postage. Alex. F. Burr, 2025 O'Donnell, Las Cruces, NM 88001.



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73, K5XY

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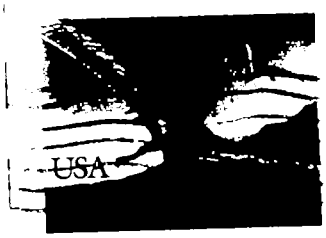

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